DPS 2001 meeting, November 2001
Session 11. Outer Planet Atmospheres Posters
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[11.14] Latitudinal variations in Jovian ultraviolet spectra

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Previous work (Edgington *et al.* , BAAS **32**, 1013, 2000; Edgington, et al., Jupiter: Planet, Satellites & Magnetosphere, Boulder, CO, 2001) has indicated that meridional winds can transport constituents that make up the Jovian atmosphere, such as ammonia and phosphine, resulting in deviations from a homogeneously mixed atmosphere. Horizontal eddy mixing will compete with the meridional circulation to restore the atmosphere to a well-mixed state (Friedson *et al.* , Icarus **138**, 141-156, 1999). A comparison of these model predictions of the latitudinal structure with observations can allow one to determine the relative roles of the two effects. Here, we present, versus latitude, synthetic ultraviolet spectra in the wavelength range of 160-230 nm, where at low latitudes ammonia, acetylene, phosphine, and hydrogen-helium Rayleigh scattering provide the major source of opacity in Jupiter's atmosphere, whereas aerosol absorption dominates at high latitudes. These spectra sample the atmosphere between roughly 1-300 mbar. We compare these synthetic spectra to observed spectra taken with HST/FOS (Edgington *et al.* , Icarus **142**, 342-356, 1999), albedos derived from HST/WFPC2 UV images (Vincent *et al.* , Icarus **143**, 189-204, 2000), and Cassini UVIS spectra at Jupiter. It is illustrated that both the synthetic spectra and the observations exhibit latitudinal structure. This structure cannot be explained by a simple geometric variation of the solar and Earth zenith angles, thus indicating the possible influence of meridional circulation in redistributing the Jovian material. At low to mid-latitudes between 190-230 nm, smaller albedos roughly correlate with regions where the residual transport (West *et al.* , Icarus **100**, 245-259, 1992) is upward, e.g. ~20N and ~25S, due to in influx of ammonia from below. Latitudes with larger albedos correspond to regions where the residual transport is downward (e.g. ~-5S), causing a depletion of ammonia. Further, we show the degree to which the predicted latitudinal structure of the albedo depends upon the strength of both the meridional circulation and the eddy mixing.

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